

Abstract

Electromechanical shutter and display comprising a two-dimensional matrix of such shutters are proposed, in which the membrane under the force of electrostatic attraction moves from its original position parallel to the substrate plane into a final position normal to the substrate plane, thereby transferring the shutter, or display pixel, from its “off” state into its “on” state. To produce the “on” state, the electrostatic force is applied only to a narrow conductive strip placed on the side of the membrane and rotates the membrane around the torsion hinges attached to this strip. Two- and three-electrode shutter and pixel configurations are considered. Both versions provide a bi-stable membrane behavior, which implies that the voltage needed to transfer the membrane into the “on” state is larger than the voltage needed to maintain the membrane in this state. This feature of bi-stability allows realization of functions “pixel hold” and “pixel select” using a simple passive matrix architecture. In the “pixel hold” state, after forming image on the screen, the display consumes essentially no power. The “on”-to-“off” contrast ratio is expected to be high. These properties are very attractive for utilization of this display for electronic book application.